ZT-2570/ZT-2571

User Manual

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, beginning from the date of delivery to the original purchaser.

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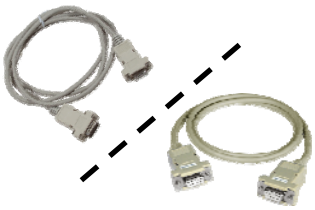
What's in the shipping package?

The package includes the following items:

ZT-257x Device

ANT-124-05



CA-0915 (ZT-2570) /
CA-0910N (ZT-2571)

Release Note

CD

If any of these items are missing or damaged, please contact your local distributor for more information. Save the shipping materials and cartons in case you want to ship the module in the future.

More Information

- Documentation :

  CD: \Napdos\ZigBee\ZT_Series\Document
  http://ftp.icpdas.com/pub/cd/usbcd/napdos/zigbee/zt_series/document

- Software :

  CD: \Napdos\ZigBee\ZT_Series\Utility
  http://ftp.icpdas.com/pub/cd/usbcd/napdos/zigbee/zt_series/utility

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1 Introduction of ZigBee

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on an IEEE 802.15.4 standard for personal area networks. ZigBee devices are often used in mesh network form to transmit data over longer distances, passing data through intermediate devices to reach more distant ones. This allows ZigBee networks to be formed ad-hoc, with no centralized control or high-power transmitter/receiver able to reach all of the devices. Any ZigBee device can be tasked with running the network.

ZigBee is targeted at applications that require a low data rate, long battery life, and secure networking. ZigBee has a defined rate of 250 kbit/s, best suited for periodic or intermittent data or a single signal transmission from a sensor or input device. Applications include wireless light switches, electrical meters with in-home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range wireless transfer of data at relatively low rates. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs.

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2 Introduction to the ZT-257x module

The Basis of ZT-257x Series Product

The ZT-2570 and ZT-2571 series modules are small-sized wireless ZigBee converters based on the IEEE802.15.4 standard that allow RS-232, RS-485 and Ethernet interface to be converted to a personal area ZigBee network. The typical transmission of ICP DAS ZT series ZigBee products is 700 meters (LOS, line of sight), with a transmission frequency range of between 2.405 GHz and 2.48 GHz, separated into 5 MHz sectors, providing 16 channels and 16384 PAN IDs. ZT-2000 series is not only a long distance wireless converter but also can act a ZigBee router to extend the transmission range and improve the quality of wireless signal.

ZT-2000 series products are specification for a suite of high level communication protocols using small, low-power digital radios module, which are fitted the ZigBee 2007 (ZigBee Pro) of ZigBee Alliance. In the ZigBee network, it is only allowed one ZigBee Host and called “ZigBee Coordinator”, ZT-2570 series products, are used to initialize and manager the routing. In addition, One ZigBee network are able to manager 255 ZigBee router and responsible for receiving or bypassing data from parent or child node.

The Benefits of ZT-257x Series Product

A Windows compatible GUI configuration utility is available. The utility allows users to set different configurations based on the type of application, together with several of required ZigBee variables such as Pan ID. The friendly user interface is also helping user be familiar with ZT-2000 series.

For more information, please refer to the relevant documents for these devices, which can be found at following link:
http://ftp.icpdas.com/pub/cd/usbcd/napdos/zigbee/zt_series/document

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3 Hardware Information

3.1 Specifications

Part Number		ZT-2570 (ZigBee Coordinator)	ZT-2571 (ZigBee Router)
Hardware			
CPU		80186, 80 MHz or compatible	
Temporary Buffer Size		2300 Bytes	
LED	**Green**	ZigBee Net	
	Yellow	ZigBee RxD	
	Red	ZigBee Power	
Communication Interface (COM 0)			
RS232		RS-232 (TxD, RxD and GND);	
		D-Sub 9 Female, Non-isolated	D-Sub 9 Male, Non-isolated
RS-485		RS-485 (DATA+, DATA-; internal ASIC self-tuner); Non-isolated	
Baud Rate		1200 ~ 115200 bps	
Data Bit		7, 8	
Parity Check		Even, Odd, None	
Stop Bit		1, 2	
Communication Interface (Ethernet)			
Ethernet		10/100 Base-TX (Auto-negotiating, auto_MDI/MDI-X, LED indicators)	
Power			
Protection		Power reverse polarity protection	
EMS Protection		ESD, Surge, EFT	
Required Supply Voltage		$+10V_{DC}$ ~ $+30V_{DC}$	
Power Consumption		2.5 W (Max.)	
Mechanism			
Casing		Plastic	
Flammability		UL 94V-0 materials	
Dimensions		33 mm x 78 mm x 107 mm (W x L x H)	
Installation		DIN-Rail	
Environment			
Operating Temperature		-25 °C ~ +75 °C	
Storage Temperature		-40 °C ~ +80 °C	
Relative Humidity		5 ~ 95% RH (non-condensing)	
Wireless			
RF Channel		16	
RF Transmit Power		11 dBm	
Antenna (2.4GHz)		5 dBi Omni-Directional antenna	
Transmit Range (LOS)		700 m (Typical)	
Max. Slaves Supported		255	
EMC		CE/FCC, FCC ID	

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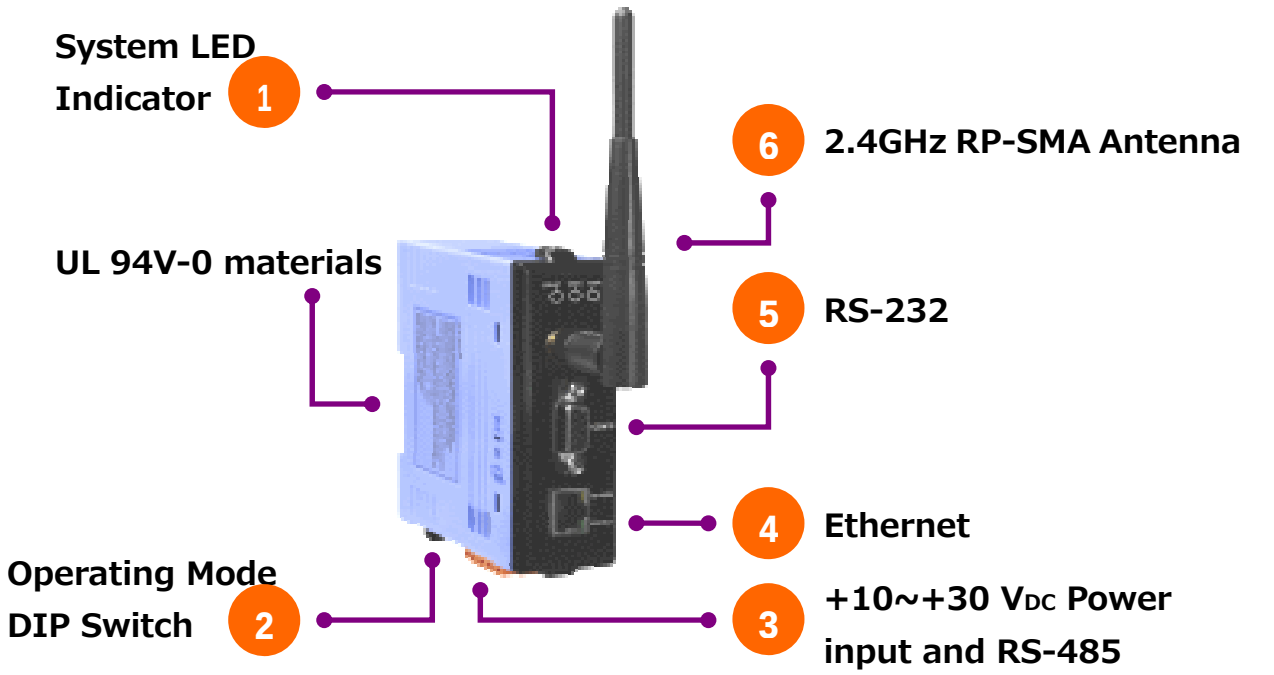
3.2 ZT-257x Front View



1. LED Indicator Status

LED Indicator	LED Color	Explain
ZigBee Net	Green	The status of ZigBee network.
ZigBee RxD	Yellow	The status of ZigBee communication
ZigBee PWR	Red	The status of module board

※ *For more details, please see the section 6 troubleshooting.*

2. Operating Mode DIP Switch
   - ZBSET : Configuration mode is able to use browser or ZT Configuration Utility to configure via the Ethernet, RS-232 or RS-485 interface.
   - ZBRUN : Transmit mode is used to transmit data to the remote device.
   - ZBINIT : Operating system initial state, it is used to update firmware.

3. RS-485 and +10~+30VDC Power input
   - The RS-485 and RS-232 are communicable via the same UART.
   - The ZigBee PWR indicator will be steady light if correct power input.

4. Ethernet
   - The port RJ-45 jack is the 10/100 Base-TX Ethernet port.

5. RS-232
   - The RS-485 and RS-232 are communicable via the same UART.

6. 2.4 GHz RP-SMA Omni-directional Antenna
   - If there is any requirement for extension cable, it must be a connector with the type RPSMA and resistance 50 Ohm. Ex. 3S001-1, 3S003-1...etc

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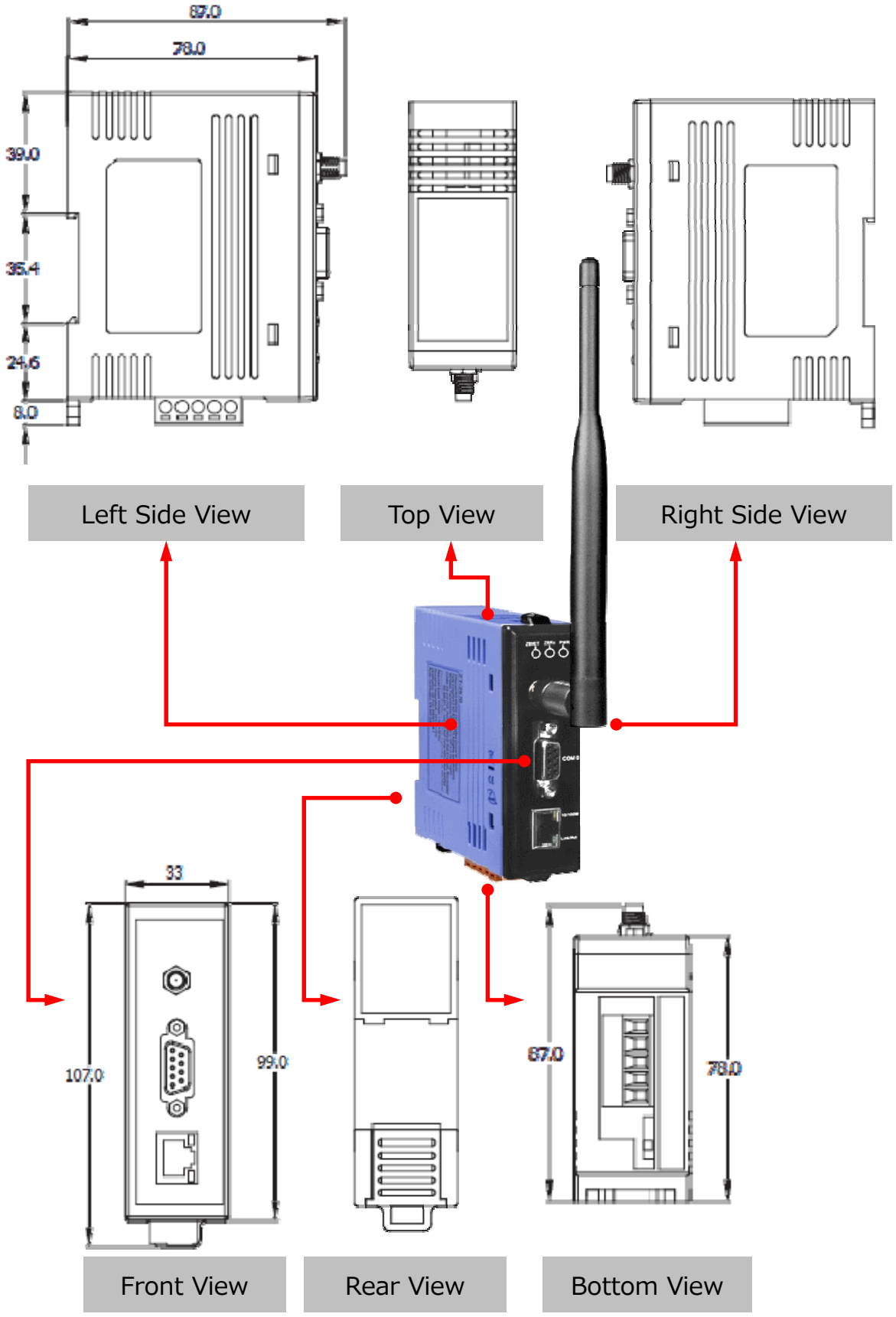
3.3 Dimensions (Units: mm)



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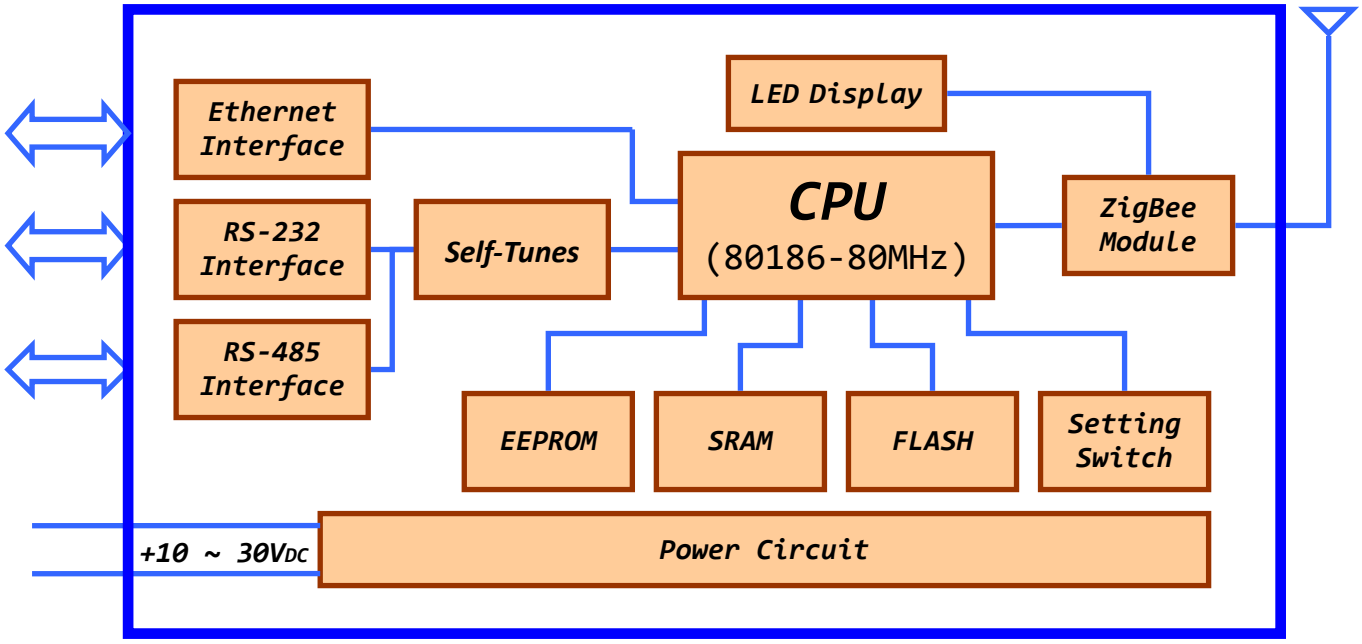
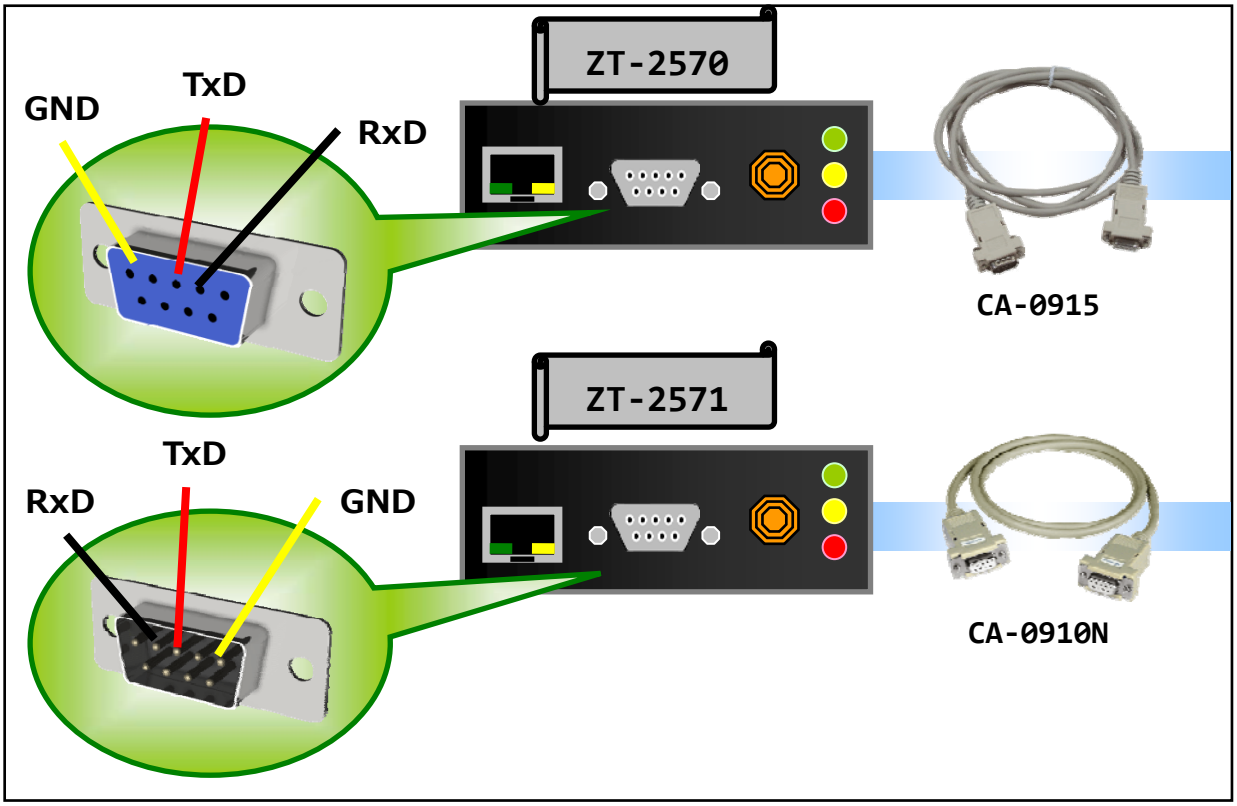
3.4 Block Diagram

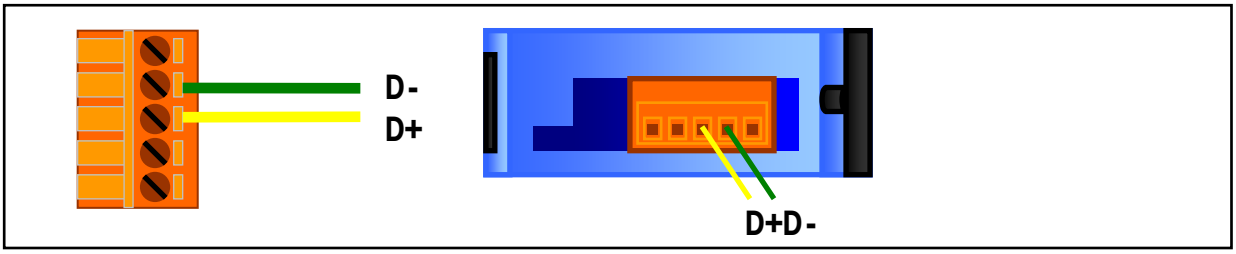


3.5 Wire Connection

1. RS-232



2. RS-485



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4 Setting up the ZT-257x module

4.1 Introduction of configurations

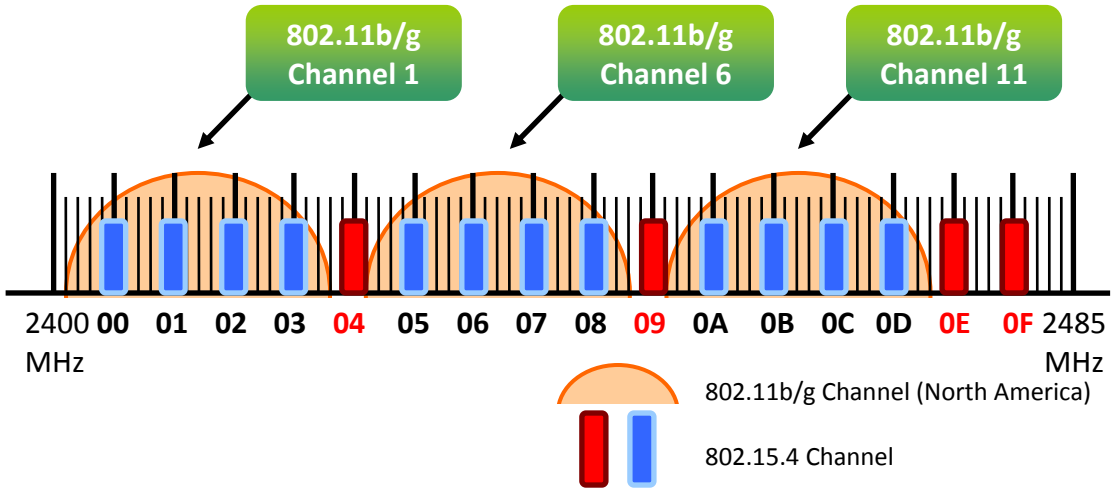
1. **"Pan ID"** is the group identity of ZigBee networks.
   It must be the same if they are in the same ZigBee network.
   (Valid values range from 0x0000 to 0x3FFF)

2. **"Node ID"** is the identity of the ZigBee module.
   The identity number must be unique if it is in the same ZigBee network as other ZigBee module. (Valid values range from 0x0001 to 0xFFF7 for a ZigBee Router, but is fixed to 0x0000 for a ZigBee Coordinator)

3. **"RF Channel"** indicates the radio frequency channel, and must be set to the same channel if the module is in the same ZigBee network as other ZigBee modules.

Channel	0x00	0x01	……	0x0F
Frequency(MHz)	2405	2410	……	2480

Note:
In addition, the RF channels 0x04, 0x09, 0x0E or 0x0F are recommended because they do not overlap with frequencies Wi-Fi.


802.11b/g Channel 1
802.11b/g Channel 6
802.11b/g Channel 11
2400 MHz
00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F
2485 MHz
802.11b/g Channel (North America)
802.15.4 Channel

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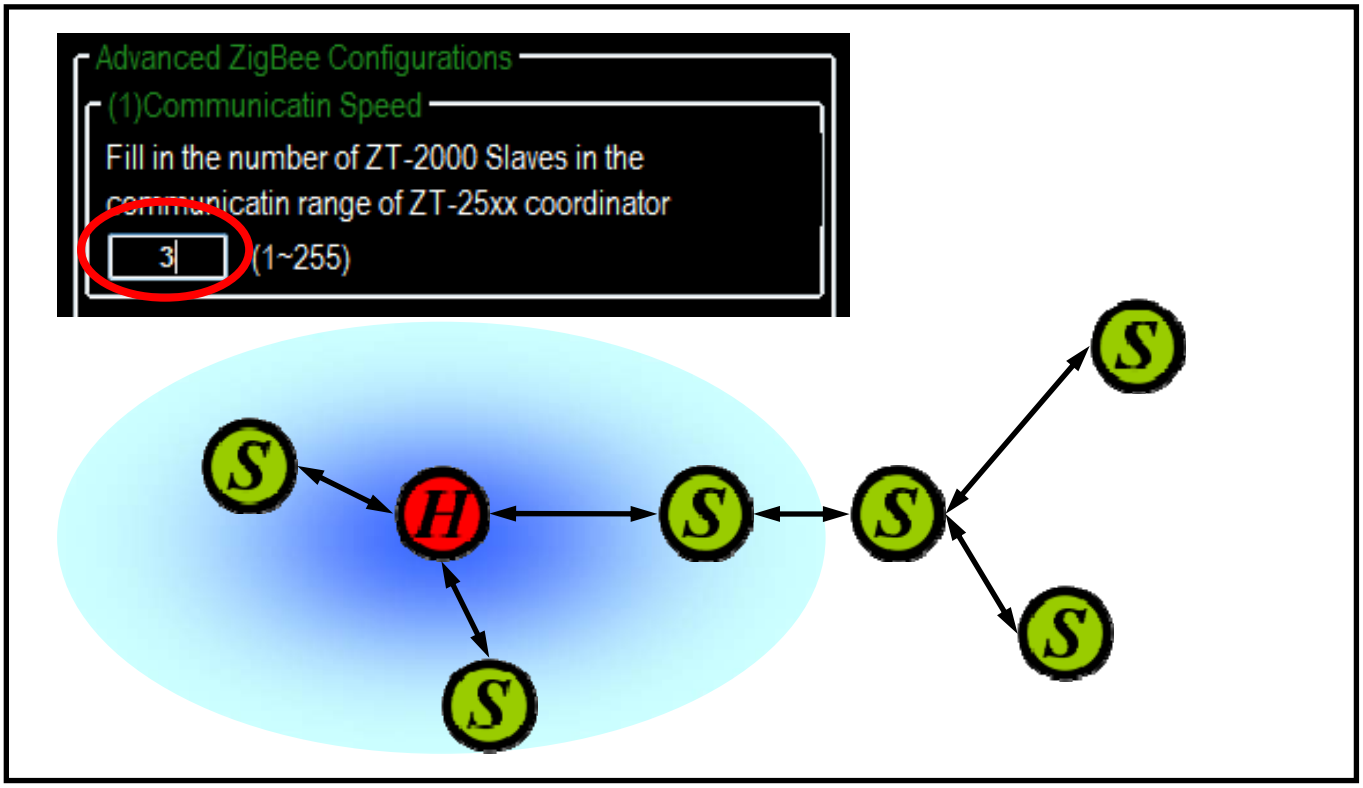
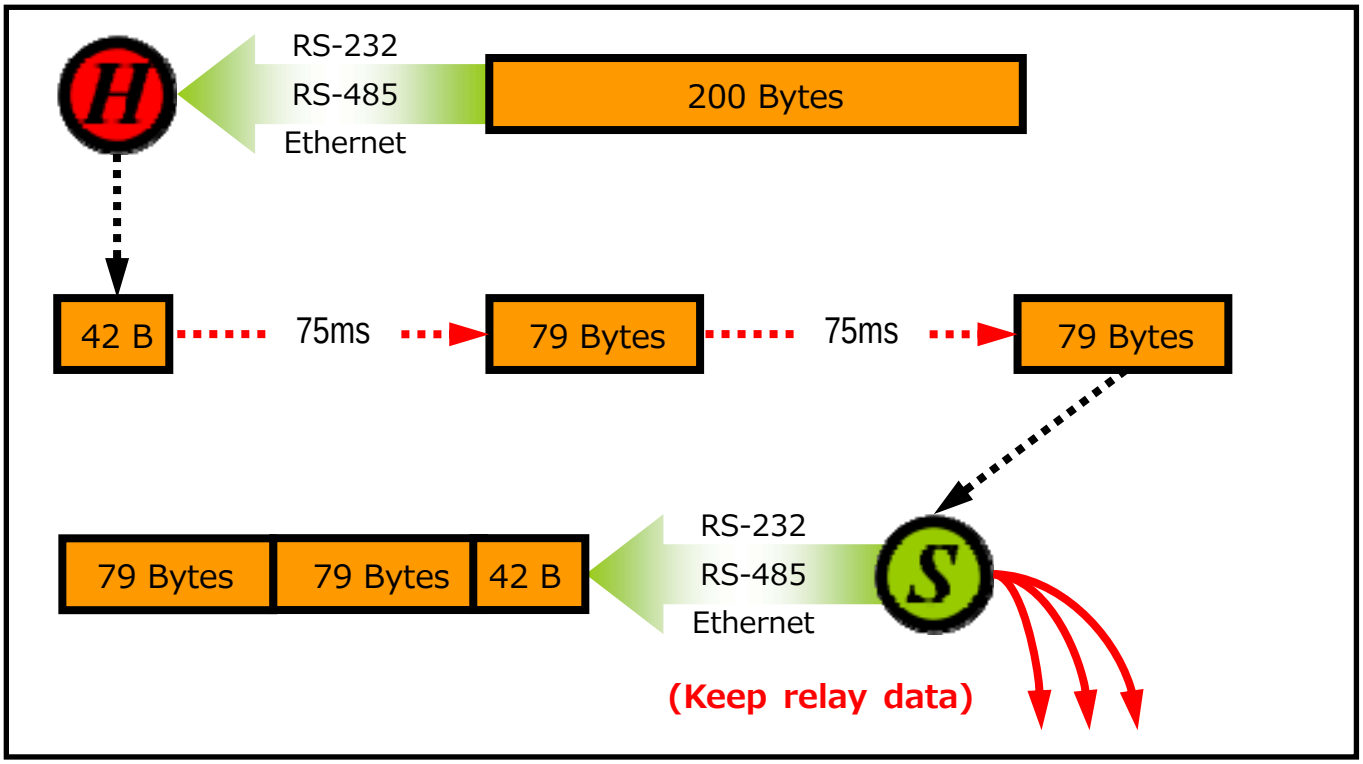
4. Communication Speed (Broadcasting Frame Sending Interval):

The packet payload of ZT-2000 series devices is 79 bytes. Data above 79 bytes will be transmitted in several packets. This parameter decides the broadcasting frame sending interval time to avoid the network overloading. User only fills in the number of ZT-2000 slaves nearby the ZigBee Coordinator.

- Example:





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5. **"RF Power"** denotes the wireless transmit power value.

Code	Note
0x0F	Typical Maximum
0x08	Fit the CE/FCC certification
0x00	Typical Minimum

※ *The parameter adjustment purely personal behavior, ICP DAS can not guarantee to pass CE/FCC certification if adjusting this parameter, nor assume any liability because of the adjustment parameters derived from the RF Power.*

6. **"Baud rate & Data Format"** values are based on the configuration of the serial port.

Item	Specification
Data Format	N81、O71、E71、N82、O81、E81 or N82
Baud rate	1200 ~ 115200 bps

7. **Communication Interface** is three types provided as below.

a. Serial Port : RS-232 and RS-485 are enabled and it allows working with Ethernet at the same time.

b. Ethernet : Either TCP Server or TCP Client is enabled and it allows working with RS-232 or RS-485 at the same time.

Virtual COM : Virtual COM driver needs to be installed in the desktop and the COM is working independently to the serial and Ethernet.

Download: http://www.icpdas.com/products/Software/VxComm/vxcomm.htm

Note: Please select "Fixed baud rate" if the virtual COM is not in the 115200 bps and N81 format.

8. **Configurations of TCP :**

ZT-257x device	
IP	IP must be the same segment with LAN segment of desktop
Mask	Mask must be the same with LAN of desktop
Gateway	Gateway must be the same with LAN of desktop
Port	User port will listen to connection request when it acts TCP Server
Connection Target (Need to set when it acts TCP Client)	
IP	The IP of connection target
Port	The port of connection target

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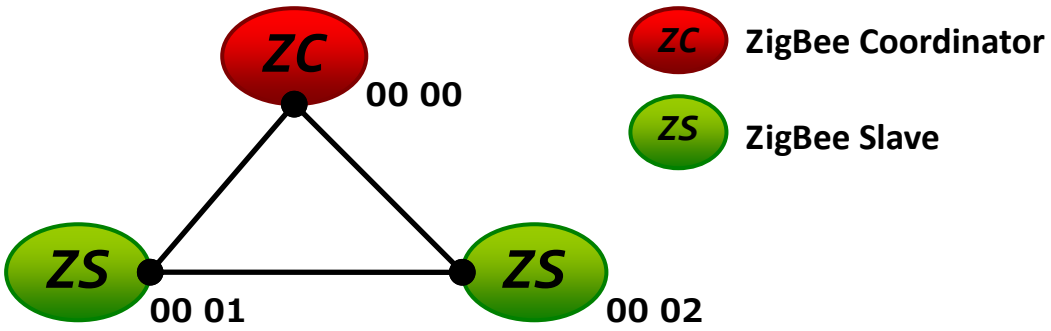
9. "Application Mode" can be changed and used for certain specific purpose.



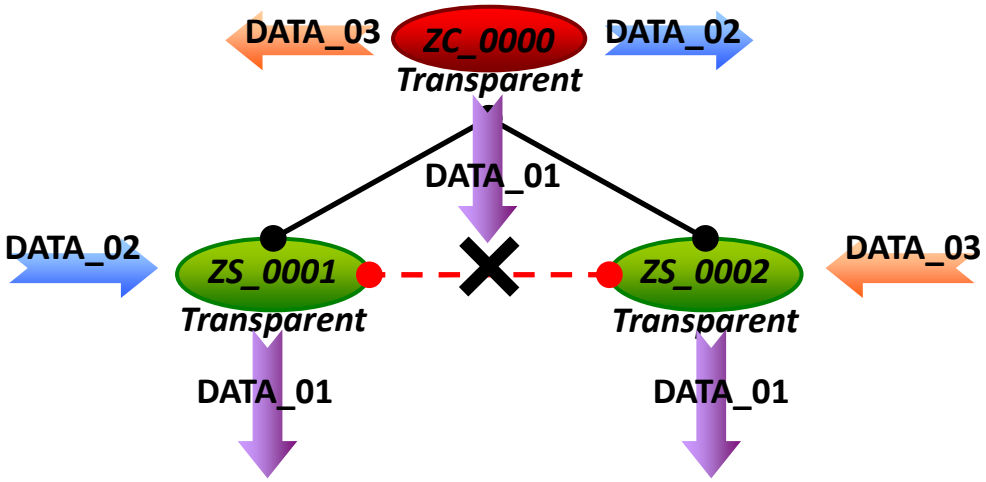
The above schematic diagram is showing what the difference of using different application modes.

a. Transparent Mode is the default application mode, and always transmits data to the remote device via broadcasting. Unless there are specific purposes, the application mode can be retained as default. The mode always bypasses data to remote side via broadcasting. If there is no particular purpose, user only keeps this application mode.

Module	Frame Type	Note
ZT-2570	Broadcast	Data will be sent to all ZigBee slaves
ZT-2571	Unicast	Data will only be sent to the coordinator

[Ex1] When ZT-2570 ZigBee Host sends "DATA_01" via broadcasting frame,
→Both of the ZigBee slave 0x0001 and 0x0002 will receive the DATA_01.
(*Note: Broadcasting type frame, data will be sent to every ZigBee slaves in the same ZigBee network*)

[Ex2] When the ZigBee slave 0x0001 sends "DATA_02" via unicast frame,
→Only ZT-2550 receives DATA_02.
(Note: Unicast type frame, data will only be sent to the ZigBee host)



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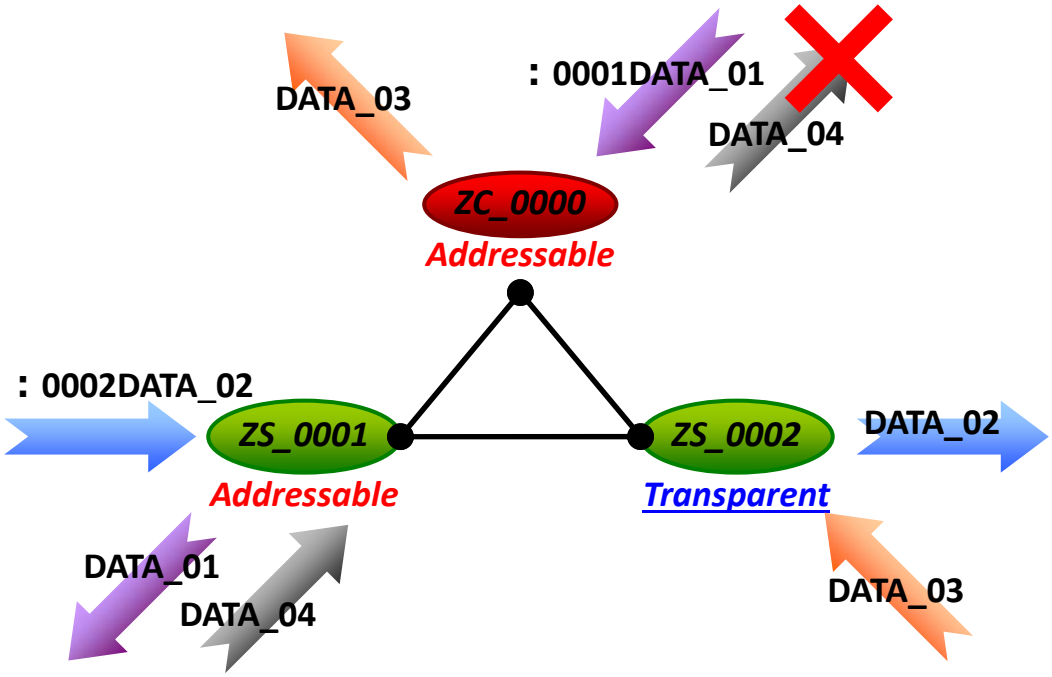
b. Addressable Mode is an advanced application mode and it is used to send data to specific ZigBee nodes. It is not only used to transmit data to specific ZigBee slaves from host but also transmit data between ZigBee slaves. A 5-byte ASCII code should be added as an index before the data.

Module	Frame Type	Note
ZT-2570 ZT-2571	Unicast	Data will be sent to a specific ZigBee slave. Format: ":AAAA" + Data

[EX1] When ZT-2570 ZigBee Host sends ":0001DATA_01" via unicast frame,
→Only the ZigBee Slave 0x0001 receives DATA_01.
(Note: Unicast type frame, data will be only sent to the specific ZigBee node)

[EX2] When ZigBee slave 0x0001 sends ":0002DATA_02" via unicast frame,
→Only the ZigBee Slave 0x0002 receives DATA_02.
(Note: Unicast type frame, data will be only sent to the specific ZigBee node)



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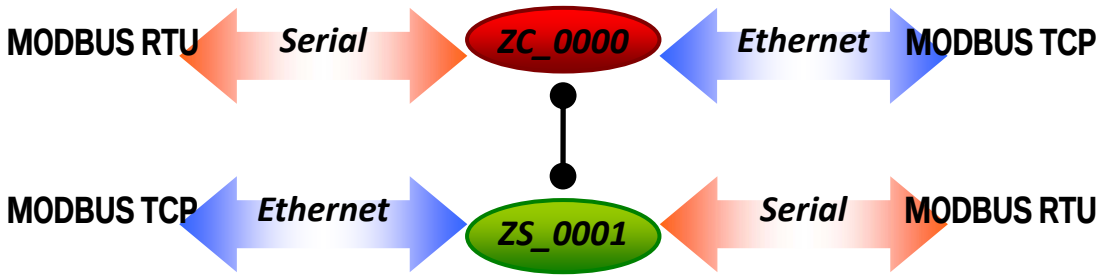
a. **Modbus Gateway Mode** is an advanced application mode and it is used to convert the Modbus protocol.Data is regarded as Modbus RTU if communicates through via RS-232 or RS-485, else data is regarded as Modbus TCP if it communicates via the Ethernet.

Module	Frame Type	Note
ZT-2570	Broadcast	Data will be sent to all ZigBee slaves
ZT-2571	Unicast	Data will only be sent to the coordinator

[EX1] When ZT-2570 receives data “MRTU_CMD_01” from serial port,
→ZT-2571 will output the data “MRTU_CMD_01” directly to serial port.
→ZT-2571 will convert protocol then output “MTCP_CMD_01” to Ethernet.
(*Note: Broadcasting type frame, data will be sent to every ZigBee slaves in the same ZigBee network*)

[EX2] When ZT-2570 receives data “MTCP_CMD_02” from Ethernet,
→ZT-2571 will convert protocol then output “MRTU_CMD_01” to serial port.
→ZT-2571 will output the data “MTCP_CMD_01” directly to Ethernet.
(Note: Broadcasting type frame, data will be sent to every ZigBee slaves in the same ZigBee network)

[EX3] When ZT-2571 transmits the acknowledgement “MRTU_ACK_03”,
→ZT-2570 will response the acknowledgement “MRTU_ACK_03” directly to serial port.
→ZT-2570 will convert protocol then output “MTCP_CMD_01” to Ethernet.
(Note: Unicast type frame, data will only be sent to the ZigBee host)



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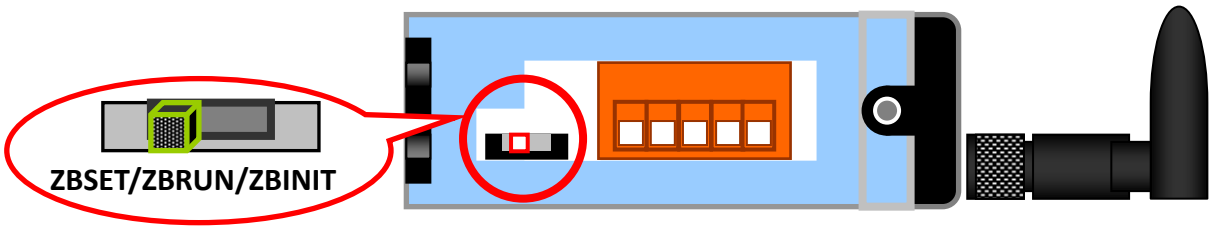
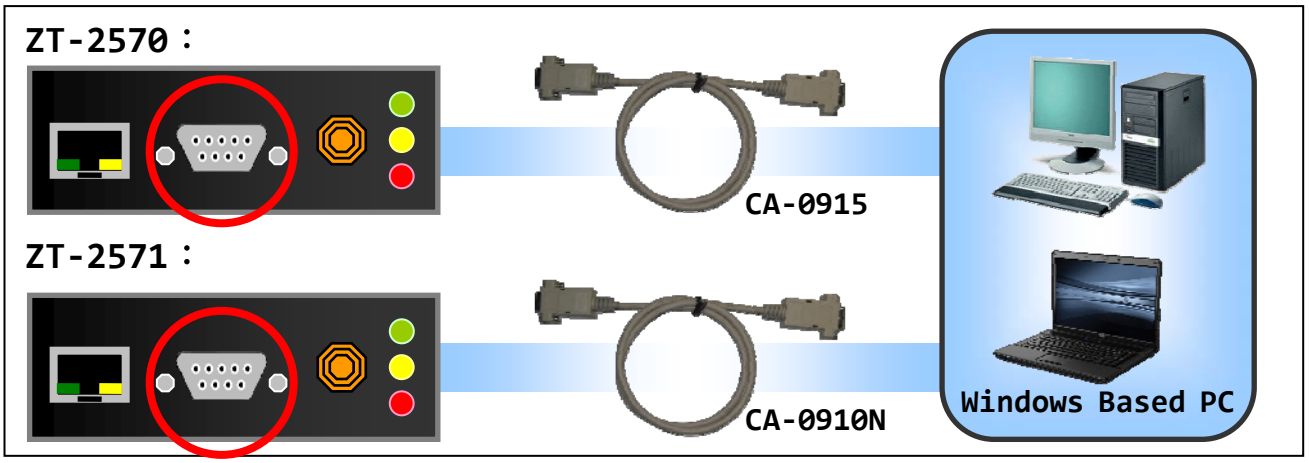
4.2 Connecting the Power and Host PC

1. Confirm that the DIP switch is set to the “ZBSET” position.

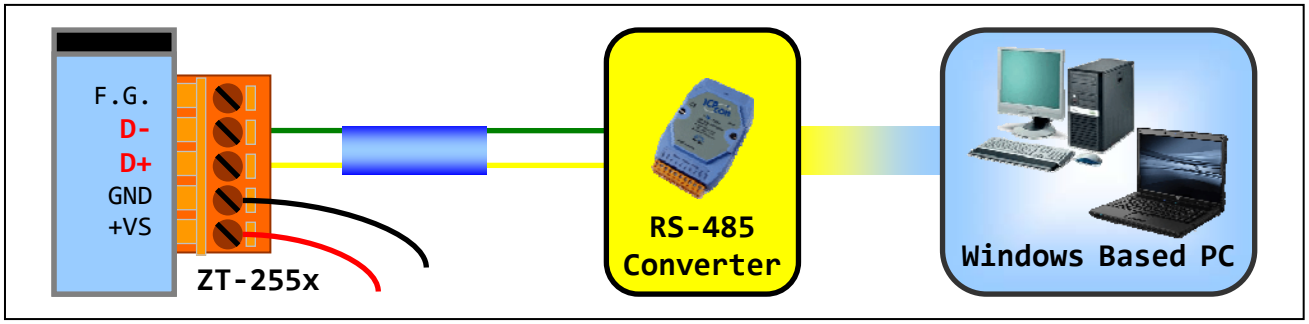


2. Connect RS-232, RS-485 or Ethernet interface to configure the ZT-257x.

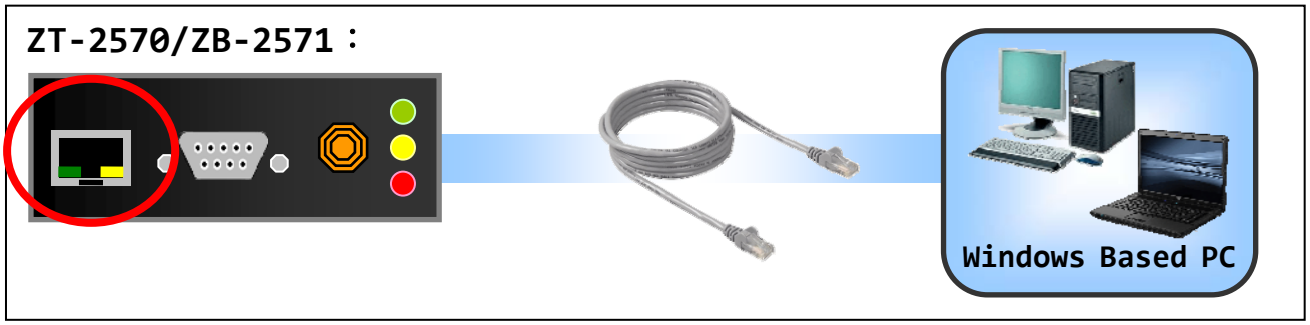
➢ RS-232 :



➢ RS-485 :



➢ Ethernet :



3. Enable the power. It means that the ZT-257x start-up procedure has been completed. If the red LED has changed from blinking to a steady light.

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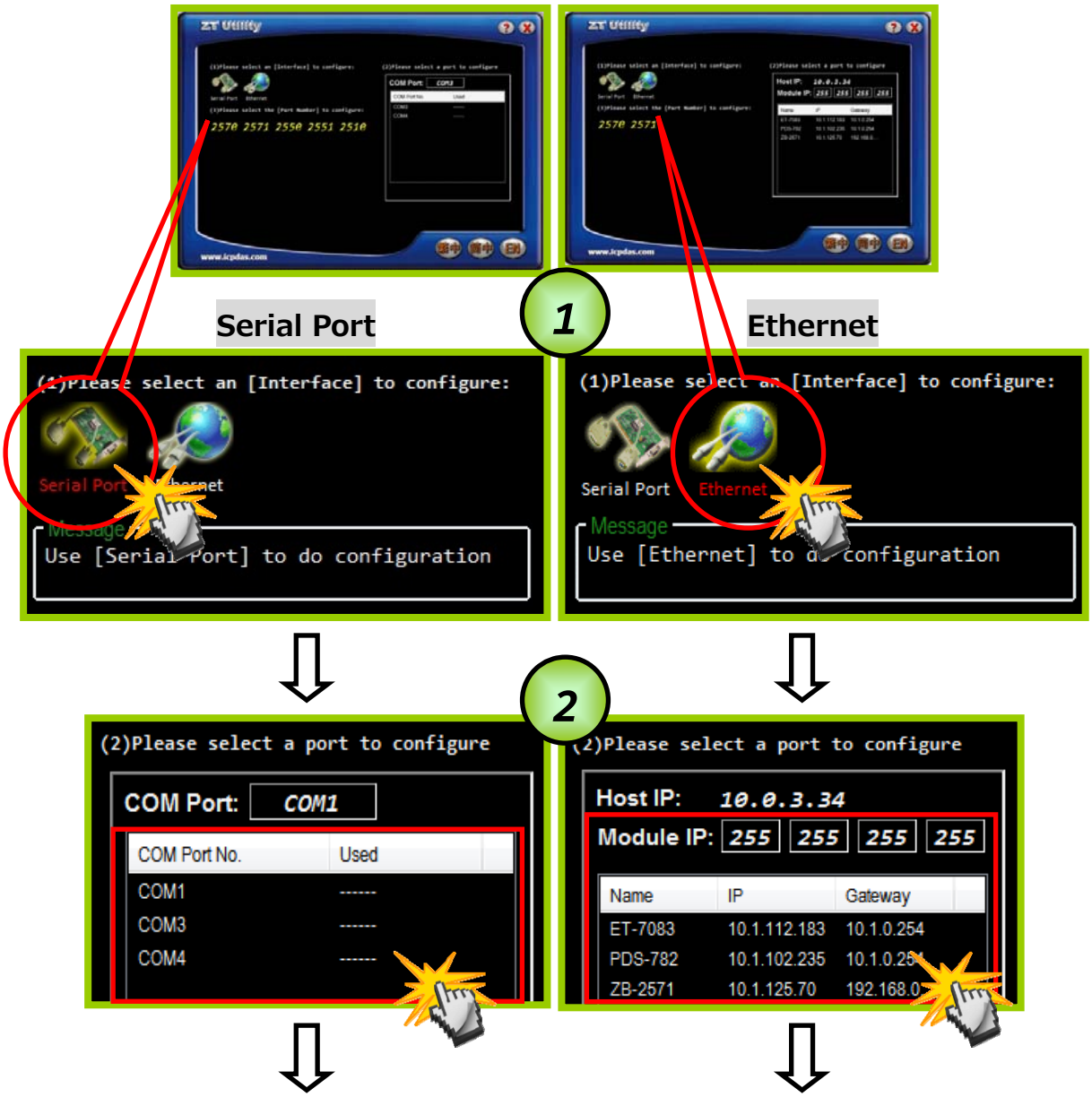
4.3 Configure ZigBee via Utility (Serial/Ethernet)

1. Launch the software “ZT Configuration Utility” and select the [ZT Series].

2. Click the either [Serial Port] or [Ethernet] icon and then select the correct COM Port number or IP address.



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3. After selecting the COM Port number, a list of model numbers will be displayed. Select the name of the module that you want to configure. After clicking the button, the utility will begin checking the connection.

4. Once a connection is established, select either the [Default] or the [Wizard] function from the settings mode page.

5. Whether you select either the [Default] or the [Wizard] option for performing configuration, both are used to configure the Pan ID, Node ID, RF Channel, RF Power, Baud rate, Data Format, Application Mode and so the relevant parameters.

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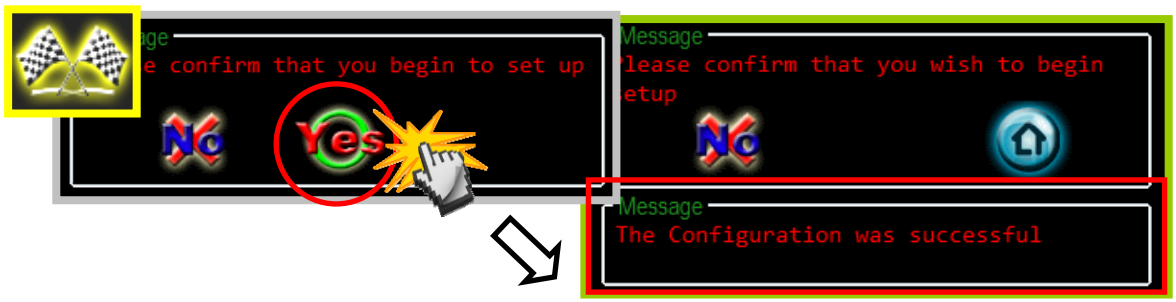
6. Once the module configuration has been completed, the message “The Configuration was successful” will be displayed. Return the DIP switch to the “ZBRUN” position and reboot the ZT-255x device.



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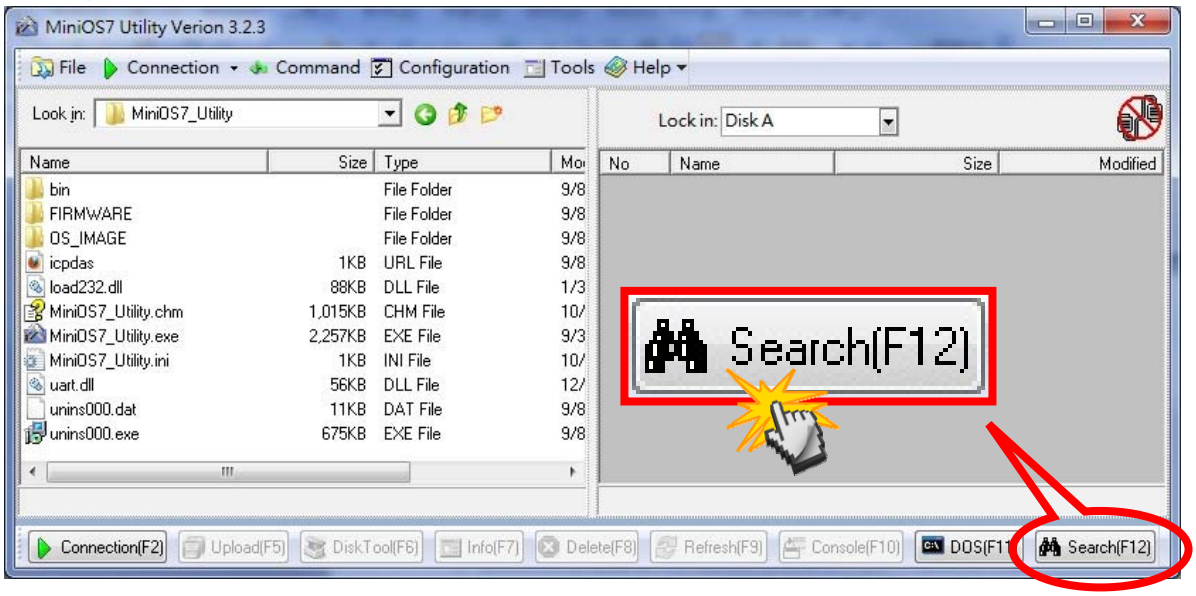
4.4 Configure ZigBee via Browser (Ethernet)

Web Server technology enables configuration of the ZT-257x via a standard web browser interface, e.g. Internet Explorer, FireFox or Mozilla, etc. This means that it is easy to check the configuration of the ZT-257x via an Ethernet network without needing to install any other software tools, thereby reducing the user's learning curve.

1. First, please confirm the desktop and ZT-257x is installed in the same network environment. The default network setting of ZT-257x as below.

ZT-257x device	
IP	192.168.255.1
Mask	255.255.0.0
Gateway	192.168.0.1

2. User is able to query and modify the IP setting through via MiniOS utility and user may download the tool from the link: http://ftp.icpdas.com/pub/cd/8000cd/napdos/minios7/utility/minios7_utility/
   a. After launching the MiniOS utility, please press the "F12" on the keyboard to search the ZT-257x device.



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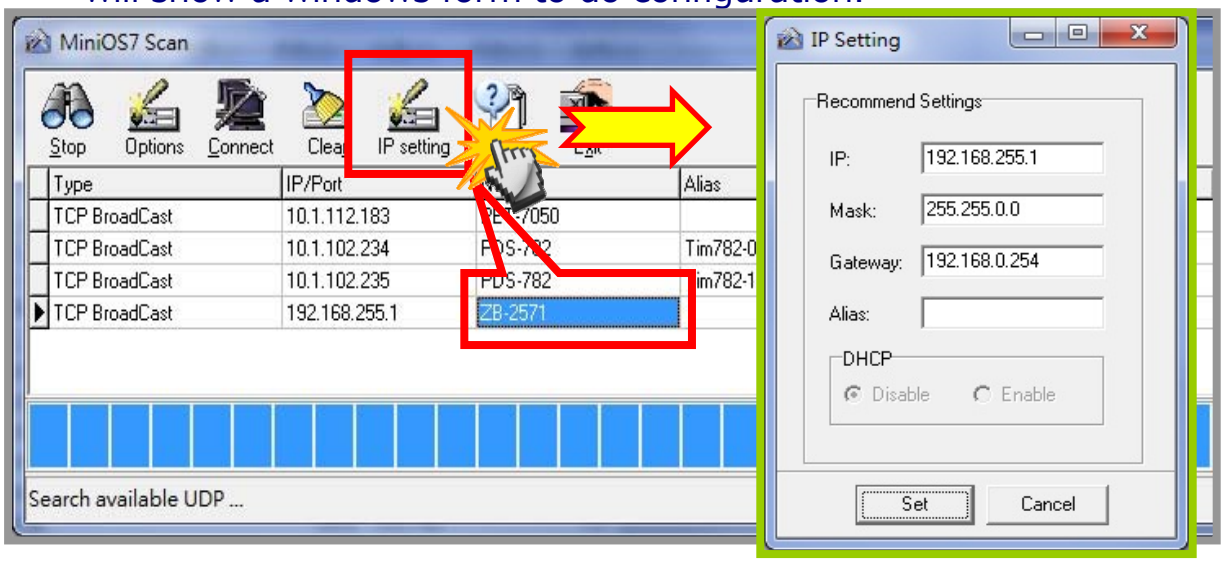
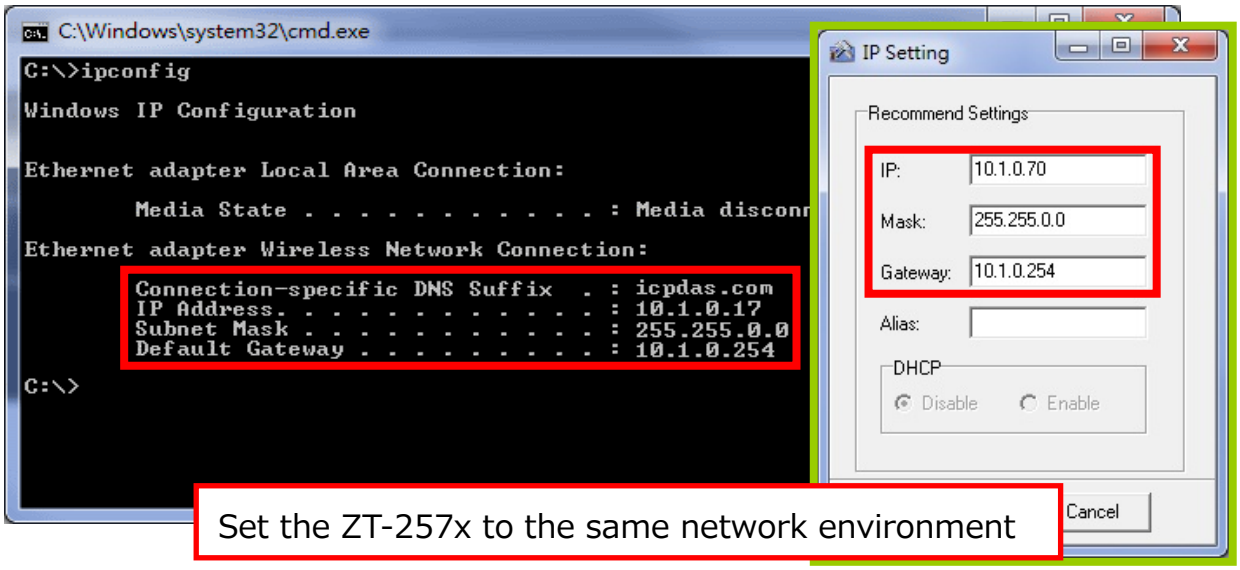
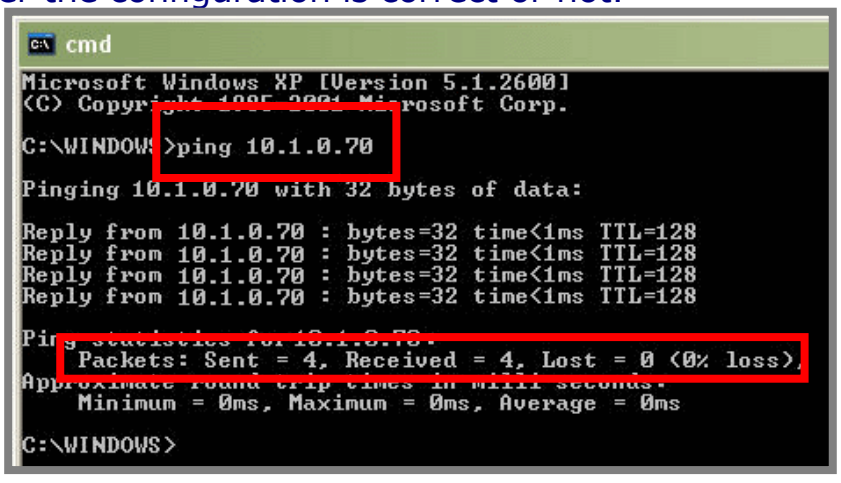
b. After selecting the ZT-257x device, please click “IP setting” then it will show a windows form to do configuration.



c. Please configure the new IP setting which is the same segment to the LAN of desktop. Please also click the “Set” button to complete the configurations.



d. After configuring the IP setting, you may try to ping the device to see whether the configuration is correct or not.



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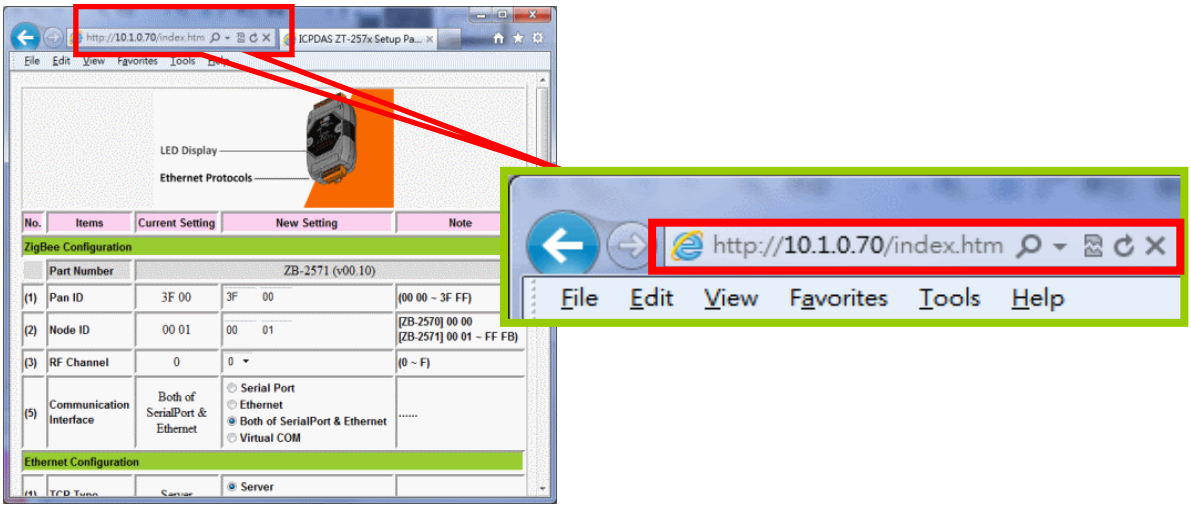
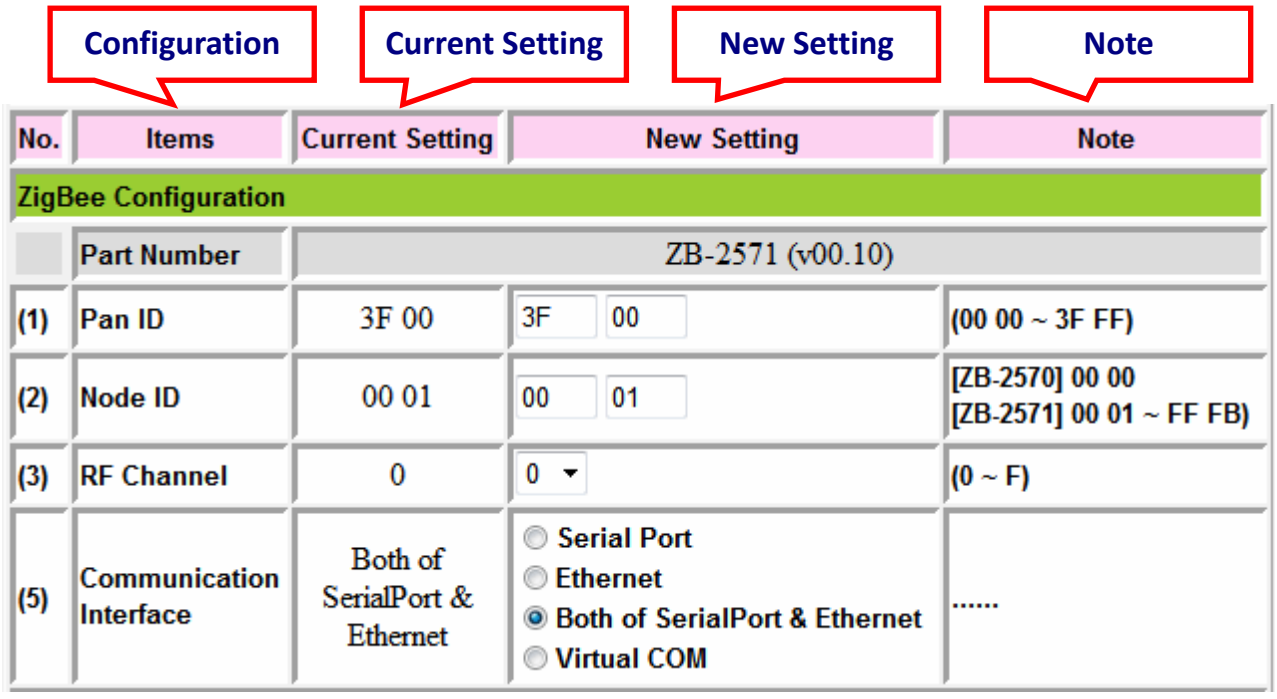
3. If they are in the same network environment, user can use a browser to set the configurations of ZT-257x. The site of ZT-257x device : http://○○○.○○○.○○○.○○○/index.htm



4. When the browser access correctly, the web page will show all the configuration settings as below. User may enter the new setting value to the correct filed if there are any requirements.



No.	Items	Current Setting	New Setting	Note
ZigBee Configuration				
	Part Number	ZB-2571 (v00.10)		
(1)	Pan ID	3F 00	3F 00	(00 00 ~ 3F FF)
(2)	Node ID	00 01	00 01	[ZB-2570] 00 00 [ZB-2571] 00 01 ~ FF FB)
(3)	RF Channel	0	0	(0 ~ F)
(5)	Communication Interface	Both of SerialPort & Ethernet	Serial Port Ethernet Both of SerialPort & Ethernet Virtual COM	.....

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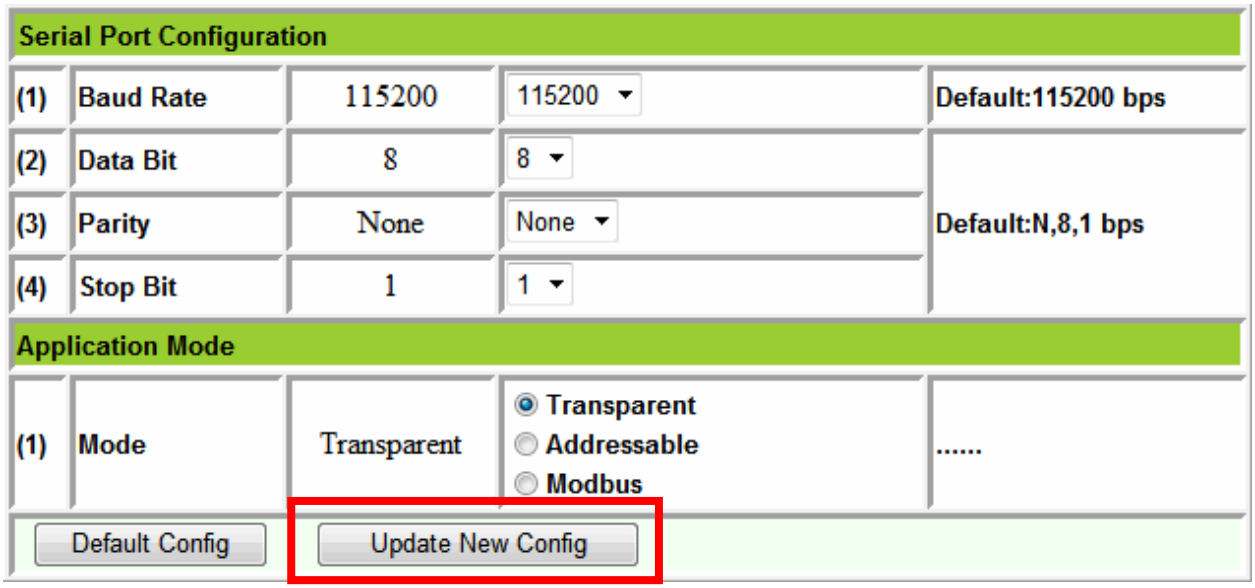
5. If the new configuration is completed, please click “Update New Config” button to start the ZT-257x configuration.

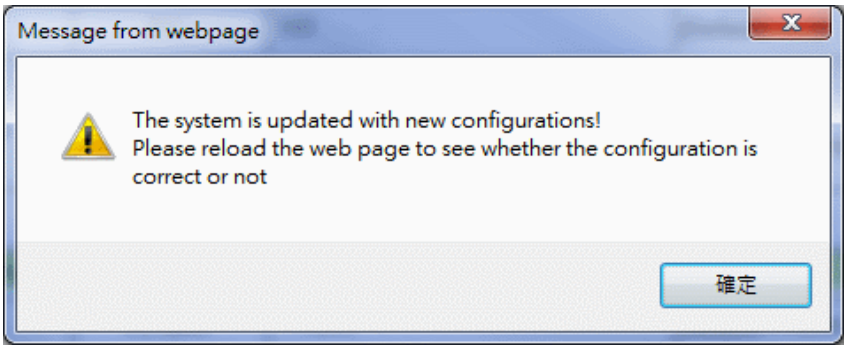

Serial Port Configuration
(1) Baud Rate 115200 115200 Default:115200 bps
(2) Data Bit 8 8
(3) Parity None None Default:N,8,1 bps
(4) Stop Bit 1 1
Application Mode
(1) Mode Transparent Transparent Addressable Modbus .....
Default Config
Update New Config

6. When the configuration completed and successful, it will show …

“*The system is updated with new configurations!*”

“*Please reload the web page to see whether the configuration is correct or not*”

then user may follow this instructions.


Message from webpage
The system is updated with new configurations!
Please reload the web page to see whether the configuration is correct or not
確定

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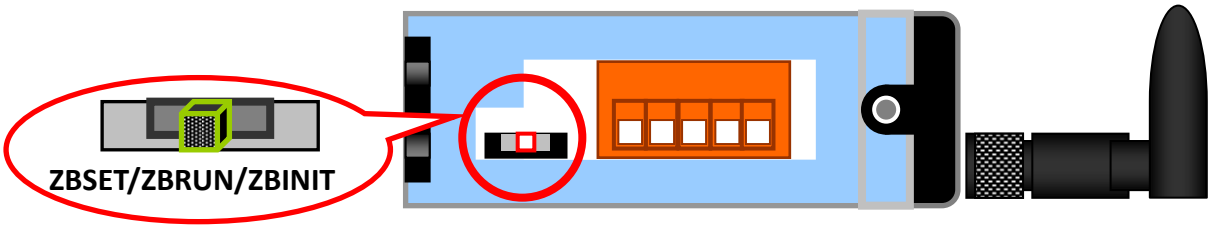
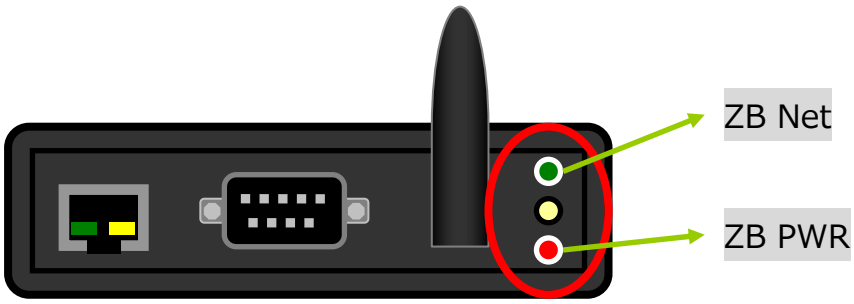
4.5 Test Communications

When all the configuration set-up completed, please turn the DIP switch to "ZBRUN" position and reboot module.



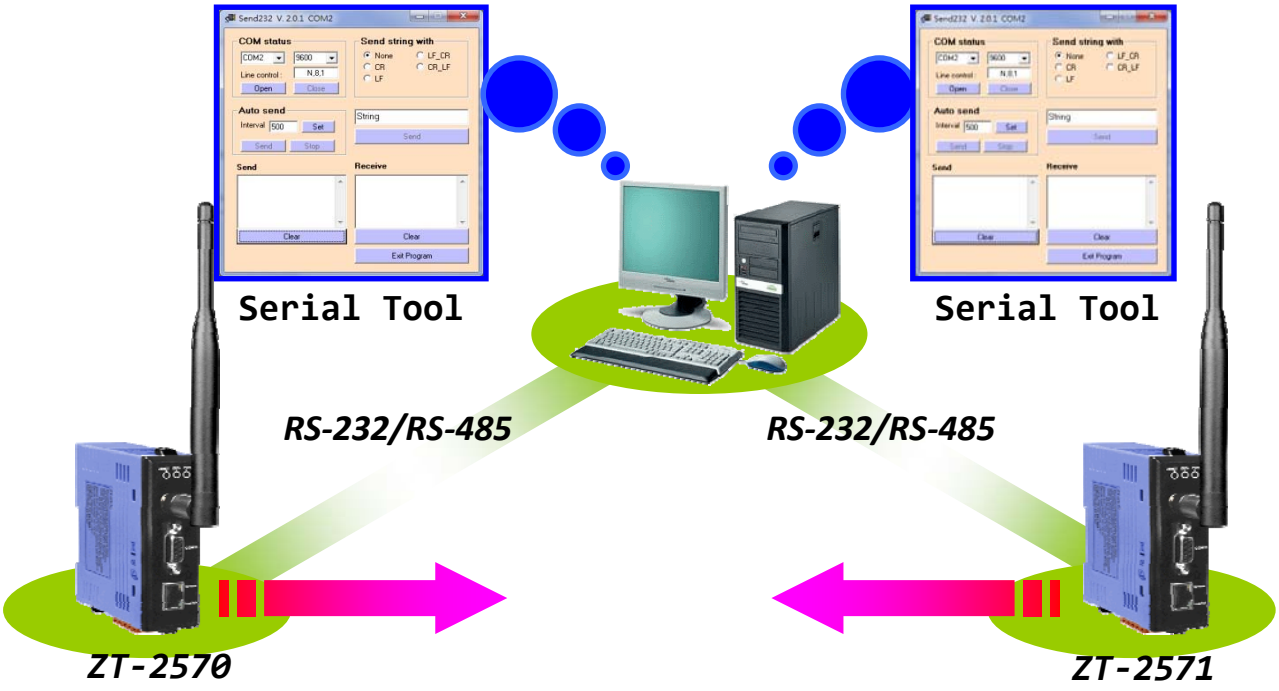
Next, please confirm the "ZB Net" LED indicator of ZigBee salves whether is steady lighted or not. If the status of green LED indicator is steady lighted, it means the connection has established and user can start using Ethernet or serial port to do communication.



A. Serial Port Test

Method (1)

Connect both the ZT-2570 and ZT-2571 to the Host PC via the RS-232 port. You may need to use two serial port tools to simulate the data transmission.



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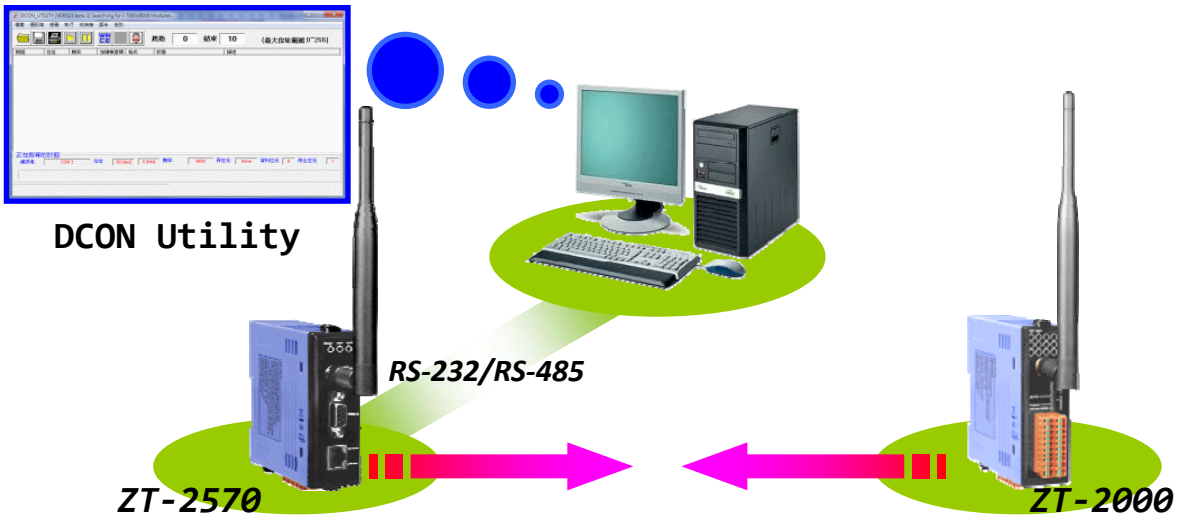
Method (2) :

Use the DCON Utility on the Host PC to search for ZT-2000 series I/O modules. If there any devices are found, it means that the configuration is correct.



※ Download MiniOS Utility :
http://ftp.icpdas.com/pub/cd/8000cd/napdos/minios7/utility/minios7_utility/

※ If there is not any serial tool can be used, please use “Send232.exe” which is a serial tool at the directory : \ICPDAS\MiniOS7_Utility\bin\Send232.exe

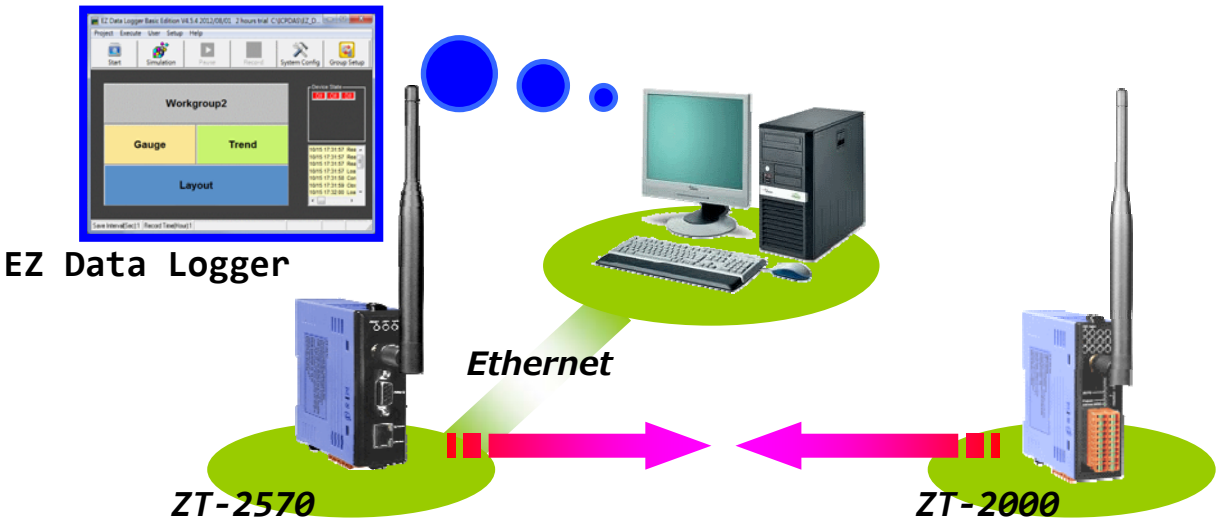
B. Ethernet Test

Method(1) :

Connect both the ZT-2570 and ZT-2571 to the Host PC via the Ethernet port. You may need to use two TCP Server/Client tools to simulate the data transmission.

Method(2) :

Use the EZ-Data Logger as a TCP Client which is connected to the ZT-2570 on the Host PC to search for ZT-2000 series I/O modules. If there any devices are found, it means that the configuration is correct.



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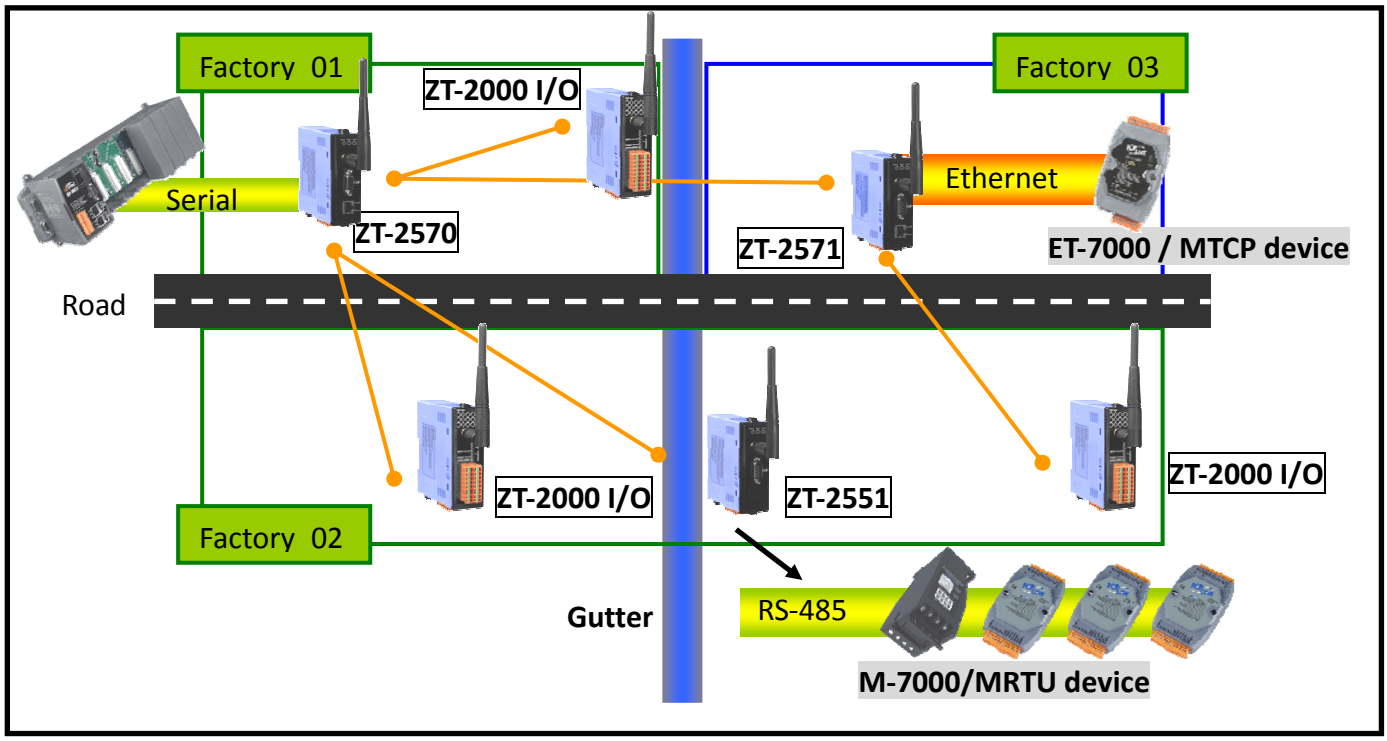
5 Applications

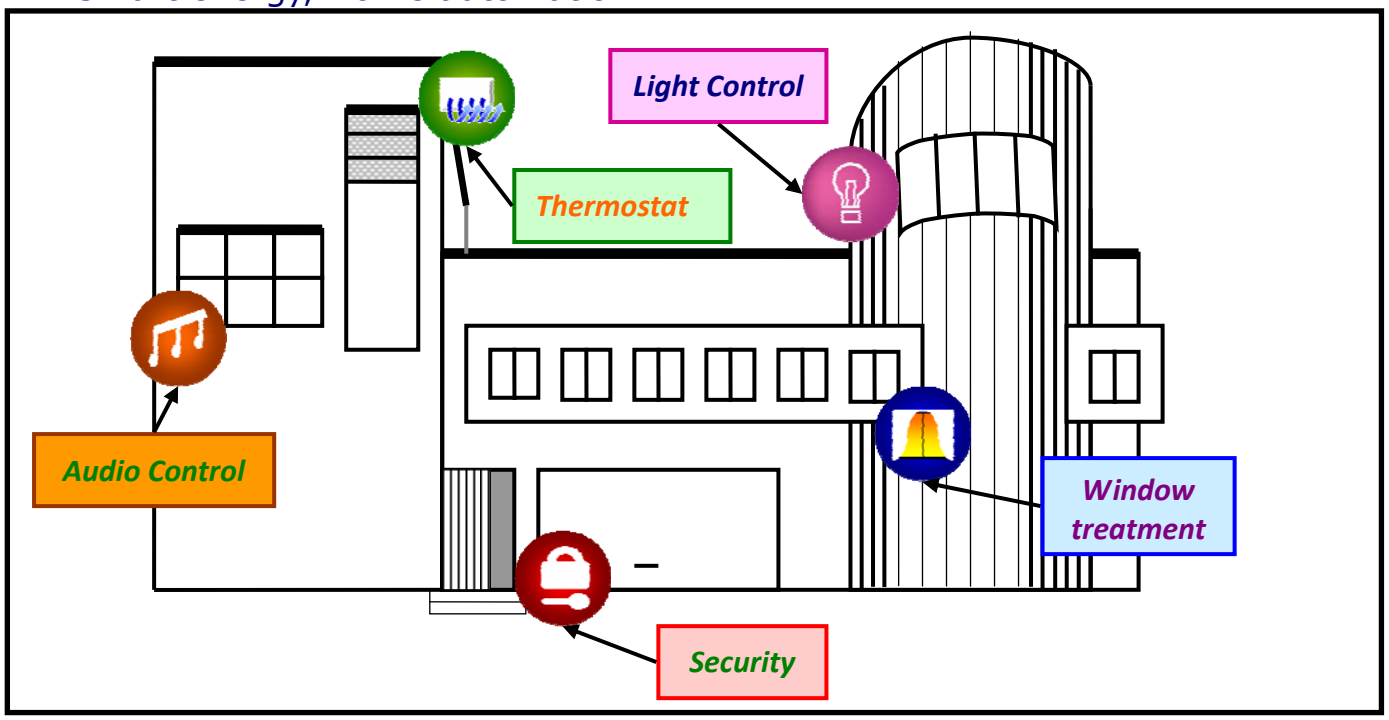
(1)ZT-257x is suitable for using in which is wiring difficult and low data rate environment.

Ex. The I/O nodes are across the road, building or gutter…



(2)ZT-255x is suitable to use in monitoring and controlling.

Ex. Smart energy, Home automation...



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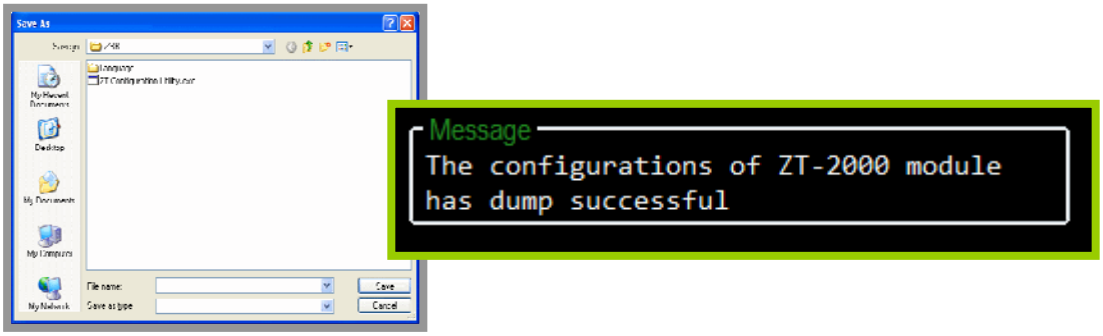
6 Trouble shooting

(1) Technical Support.

If you are any difficulties using the ZT-255x module, save the ZigBee configurations using the described below. Please also provide a description of problem and attach file to an email and send it to service@icpdas.com

1. Set the DIP switch of the ZT-255x device to the [ZBSET] position then reboot the device. Launch the ZT Configuration Utility and select [Save Log] icon to save the configuration of ZT-255x as a file.

2. After clicking the [Save Log] icon, enter the “File Name” and “File Path” in the Windows save dialog. Once the configuration has been successfully saved, the following message will be displayed.



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(2) LED Indicator Status :

LED Indicator	Status	Introduction
ZigBee Net (Green LED)	The status of ZigBee network [ZigBee Coordinator (Host)]	
	Steady Lit	ZigBee network is establish
	Blink to Steady Lit	Rejoin ZigBee network or it has occupied
	The status of ZigBee network [ZigBee Router (Slave)]	
	Steady Lit	Signal Strength
	Blinking (500 ms)	Signal Available
	Blinking (1s)	Signal Weak
	Blinking (2s)	Signal Terrible or No ZigBee Network
ZigBee RxD (Yellow LED)	The status of ZigBee communication	
	Blinking	Receiving ZigBee data
	Steady Unlit	No ZigBee data received
ZigBee PWR (Red LED)	The status of module board	
	Steady Lit	Power on
	Blinking (200ms)	Module Initialization failure
	Blinking (1s)	Watchdog enabled
	Steady Unlit	Power off

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7 Appendixes

◆ Technology Support

If there is any question or concern for using ZT-2000 series module, please feel free to contact us. ICP DAS will reply you within three days at most as possible as we can.

Taiwan

Website : http://www.icpads.com
E-Mail : service@icpdas.com
TEL : 886-3-597-3366
FAX : 886-3-597-3733

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